are facsimiles of manuscripts and reproductions of portraits. They are not arranged according to any special plan, except, possibly, the order in which they may have reached the editor.

Among the 34 sketches by 17 authors, in the part under review, are the following seven sketches which have interest for us: Redento Baranzano (1590–1622), philosopher and astronomer, by G. Boffito, 208–212; Ulisse Dini (1845–1918), mathematician, by G. Loria, 137–150; Leonardo Fibonacci (sec. XII–XIII), mathematician, by G. Loria, 4–12; Giovanni Inghirami (1779–1851), astronomer and geodesist, by G. Giovannozzi, 188–196; Giovanni Antonio Magini (1555–1617), astronomer and geographer, by A. Favaro, 101–111; Giuseppe Moletti (1531–1588), astronomer and cosmographist, by A. Favaro, 36–39; Giovanni Virginio Schiaparelli (1835–1910), astronomer and historian of science, by E. Millosevich, 45–67.

The sketch of Dini is divided up as follows: "Vita" (containing portrait and a two-page facsimile of a manuscript), pages 137–141; "Opera," 142–146; "Bibliografia" with a list of 62 scientific papers in addition to parliamentary papers, 146–152; "Letteratura" which contains simply the references to the sketches of Dini by L. Bianchi and W. B. Ford. [Compare *1919*, 205, 455; *1920*, 271.]

So also for Leonardo: "Vita," 4–5; "Opera," 6–10; "Bibliografia," 11; "Letteratura," 12, the last title in which is R. B. McClenon, "Leonardo of Pisa and his *Liber Quadratorum*," published in this Monthly, *1919*, 1–8.

Everyone interested in the history of science will wish to have in his library a copy of Mieli's valuable "Repertorio."

R. C. Archibald.

January 19, 1921.

Das Fermatproblem in seiner bisherigen Entwicklung. By Paul Bachmann. Berlin and Leipzig. Walter de Gruyter & Co., 1919. 8 + 160 pages. Price 12 marks.

This little book, written in the terrible days of 1918, is in honor of the fiftieth anniversary of the doctorate of Felix Klein. It is avowedly a glorification of German scientific effort in the theory of numbers, but the author is too great a scientist to allow any unworthy motive to color the presentation of the subject. He treats the work of German and non-German with scholarly impartiality and thoroughness.

The book gives in very convenient form the chief results of 284 years of struggle with the problem of proving the possibility or impossibility in integers of the equation

$$x^n + y^n = z^n$$

for values of n greater than 2. This problem, raised by certain comments of Fermat, was the object of a prize by the French Academy in 1823, and later in 1853. In 1908 a prize of 100,000 marks was offered by the Royal Academy of Science of Göttingen for a solution of the problem. Apart from the stimulus

added by these prizes the problem itself seems one that is particularly attractive to mathematicians, both amateur and professional. It is also one that has tripped up so many eminent thinkers that one is tempted to fancy that the great Fermat himself was deceived in thinking that he had a "truly remarkable proof."

If the value of a problem be measured by the number of different theories developed in trying to prove it, one would be puzzled to find a more valuable one than Fermat's last theorem. In some respects it would have been a calamity if Fermat had taken a little more paper and jotted down the method he employed to establish it, if he did establish it. The development of the theory of Algebraic Numbers might have been delayed many years.

D. N. LEHMER.

The Theory of Relativity. By R. D. CARMICHAEL. Second edition. (Mathematical Monographs No. 12). New York, J. Wiley & Sons, 1920. 112 pages. Price $1.50.

Preface—"The theory of relativity has now reached its furthest conceivable generalization in the direction of the covariance of the laws of nature under transformations of coordinates. The older theory of relativity remains valid as a special case of the general theory and may well serve as an introduction to its more far-reaching aspects. Accordingly, in the present (second) edition of this monograph I have retained the older theory in precisely the same form as in the first edition, the matter covering Chapters I to VI of the present treatment, and have added the longer Chapter VII to give a compact account of the generalized theory. The tendency now is to call the latter the theory of relativity and to distinguish the older from it by giving to the older theory the name of the restricted theory of relativity.

In the opening section (§ 37) of the new chapter, I give a brief summary of results from the restricted theory. Anyone who is acquainted with these, whether derived as in this book or otherwise, may proceed at once to the reading of Chapter VII. It is believed that he will find in it about as brief an account of the new theory as can be given so as to be easily intelligible and at the same time to reach the general theory of gravitation, to make clear the nature of the three famous crucial phenomena, to associate the theory with Maxwell's electromagnetic equations, and to place the whole in its proper setting with respect to the general body of scientific truth.

The new as well as the older matter in the booklet has been written from the point of view of the usefulness of the theory of relativity in the development of physical science. No applications are given other than those which are directly and immediately associated either with the fundamental ideas or with certain crucial phenomena for testing the validity of the theory. In this way only may the central elements of novelty most readily be brought to light.

No attempt has been made to give a complete account of the theory. The purpose of the monograph is best served by presenting only those fundamental developments which are needed for and contribute directly to making clear the main characteristics of the theory. The more detailed statements are to be found elsewhere, especially in the memoirs which have now reached a considerable number.

Every exposition of the general theory of relativity must be deeply indebted to the basic memoir of Einstein, published in 1916 in *Annalen der Physik,* volume 49. Very useful to me also, as every reader will observe, has been the report of A. S. Eddington to the Physical Society of London on "The Relativity Theory of Gravitation," a booklet to which one may be referred who wishes to go further into the theory than the exposition of the present monograph will carry him."

Contents—Chapter I: Introduction, 7–14; II: The postulates of relativity, 15–26; III: The measurement of length and time, 27–43; IV: Equations of transformation, 44–48; V: Mass and energy, 49–62; VI: Experimental verification of the theory, 63–72; VII: The generalized theory of relativity, 73–110. Index, 111–112.